Grade 3 Standards and Learning Activities

SCIENTIFIC THINKING AND INQUIRY

3.1. Broad Concept: Scientific progress is made by asking relevant questions and conducting careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations.

Students:

1. Recognize and explain that when a scientific investigation is repeated, carefully and under the same conditions, a similar (but not necessarily identical) result is expected.

2. Participate in different types of guided scientific investigations (related to content in this grade), such as observing objects and events and collecting specimens for analysis, including longer-term investigations that take place over several days, weeks, or months.

3. Keep and report records of investigations and observations using tools, such as journals, charts, graphs, and computers.

4. Discuss the results of investigations and consider the explanations of others.

5. Demonstrate the ability to work cooperatively while respecting the ideas of others and communicating one's own conclusions about findings.

6. Measure and mix dry and liquid materials in prescribed amounts, following reasonable safety precautions.

7. Keep a notebook that describes ongoing observations and that is still understandable weeks or months later.

8. Appropriately use simple tools — such as clamps, rulers, scissors, and hand lenses, as well as other technology (e.g., calculators and computers) — to help solve problems.

9. Make sketches and write descriptions to aid in explaining procedures or ideas.

10. Ask, "How do you know?" in appropriate situations, and attempt reasonable answers when others ask the same question.

11. Explain that one way to make sense of something is to think of how it compares to something more familiar (e.g., vibrations of an object in air such as a tuning fork, a plucked string of a string instrument, human vocal cords).

Examples

Students blow up balloons of different sizes with different amounts of air. They repeat several trials to predict the trajectory of the balloons when let go. They construct an obstacle course to direct the moving balloon through a designated target area (3.1.1, 3.1.3, 3.1.8, and 3.1.10).

Students maintain a log of the height, appearance, and colors of plants that grow from seeds (3.1.2 and 3.1.3).

Students design a lever, putting unequal weights on the ends of a balance board. They find ways to restore the balance by moving the fulcrum, keeping each weight in the same place. Discuss what happens (3.1.4).

Students follow directions to seed and plant different specimens of plant life, which would need different kinds of soil and amounts of sunlight and water. They record the necessary procedures and care for their own plants over time (3.1.6 and 3.1.7).

SCIENTIFIC THINKING AND INQUIRY (CONTINUED)	
	Students draw and describe the movement of marbles or billiard balls that hit one another (3.1.9).

SCIENCE AND TECHNOLOGY

3.2. Broad Concept: Although each of these human enterprises of science and technology has a character and history of its own, each is dependent on and reinforces the other. As a basis for understanding this concept,

Students:

1. Define technology as the application of human ingenuity and skill to the solution of practical problems (e.g., typewriter, computer).
2. Identify and demonstrate how an invention can be used in different ways, such as a radio or a cell phone that can be used to receive both information and entertainment.
3. Construct something to perform a task, by using commonly available materials, such as paper, cardboard, wood, plastic, or metal, or by using existing objects.

Examples

Students design, make, and fly kites, modifying the kites so that they fly higher, maneuver more easily, or achieve other goals (3.2.1).

Students choose one machine and report what the components of that machine are. They ask how those components came to be or what needed to be thought for those parts and pieces to be needed or necessary (3.2.1).

Students discuss the history of the cell phone, light bulb, needle, computer, knife, clock, or cup (3.2.2).

Students design and construct a telephone (prototype) using a variety of materials (e.g., paper cups, string, tin cans, and wire). They determine which prototype works best and discuss possible reasons why (3.2.3).

EARTH SCIENCE

3.3. Broad Concept: Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept,

Students:

1. Observe and describe the apparent motion of the sun and moon over a time span of one day.
2. Using a globe, demonstrate how the Earth rotates on its axis every 24 hours, producing the night-and-day cycle.
3. Observe and describe how there are more stars in the sky than anyone can easily count, but they are not spaced or spread evenly.
4. Observe and describe that the sun can be seen only in the daytime; the moon can be seen sometimes at night and sometimes during the day.

EARTH SCIENCE (CONTINUED)

5. Observe and describe the changes that occur in the observable shape of the moon over the course of a month (i.e., the moon looks a little different every day, but looks the same again about every four weeks).

6. Demonstrate and describe that sunlight can be blocked to create shadows, and the direction and length of shadows vary at different times of day.

Examples

Students design and build a sundial (with support from the teacher) and use it to determine the time of day. They explore how accurate it is over time and determine the conditions under which the sundial does and does not work (3.3.1).

Students collect the weather pages from the local newspaper for a two-week or four-week period, noting the times of sunset and sunrise. They chart those times and their changes on a sphere (3.3.2).

Students visit a planetarium. In class, they make a chalk dot model of stars and create their own constellations by connecting the random dots into patterns (3.3.3).

Students record the observable shape of the moon from personal or computer resources for two months. Then students design and create a calendar that illustrates the phases of the moon (3.3.5).

Students go to a playground to observe changes in objects' shadows at different times during the course of a day. They outline, measure, and record the length of the shadows, and they explain the variations (3.3.6).

PHYSICAL SCIENCE

3.4. Broad Concept: Energy takes many forms and has many sources. As a basis for understanding these concepts,

Students:

1. Recognize that energy is needed to carry out almost any kind of change.

2. Describe basic forms of energy, including mechanical (kinetic and potential), light, sound, heat, chemical, nuclear, and electrical.

3. Recognize that energy can be transformed from one form to another.

4. Describe how people use electricity or the chemical energy from burning fuels, such as wood, oil, coal, or natural gas, to obtain heat energy for doing tasks, such as cooking their food and warming their houses.

5. Investigate and describe how moving air and water (carriers of kinetic energy, the energy of motion) can be used to run machines like windmills and waterwheels.

6. Demonstrate that things that make sound do so by vibrating objects, such as vocal cords and musical instruments. Describe that the sound travels as a vibration through the air.

Examples

Students blow into a tube inserted into water that has paper floating in it. Then they talk into the tube. They discuss the different kinds of energy that are created, the kinds of changes the energy made, and where the energy went (3.4.1).

PHYSICAL SCIENCE (CONTINUED)	
	Students investigate heat and friction by rubbing or mixing substances and materials together. They take note that sound and light do not create the same effects (3.4.2). *Students fry an egg or make toast. They discuss how heat energy changes the food and provides chemical energy to those who eat it (3.4.3).* *Students design and build a simple roller coaster for a toy car (with help from the teacher) to demonstrate how energy changes from one form to another (3.4.3).* *Students conduct a survey of students' energy use at home and select an appropriate way to display the comparative data (3.4.4).* *Students make milk carton waterwheels to simulate a life-size model of the same (3.4.5).* *Students make a musical instrument out of commonly found materials. They explain the relationship between its sound and shape. They use the instrument in air and under water, and they note the kinds of sounds and vibrations produced (3.4.6).*

LIFE SCIENCE	
3.5. Broad Concept: Plants and animals can be classified according to the physical characteristics that they share. As a basis for understanding this concept,	
Students:	
1. Demonstrate that a great variety of living things can be sorted into groups in many ways using various properties, such as how they look, where they live, and how they act, in order to decide which things belong to which group.	
2. Explain that characteristics used for classification depend on the purpose of the grouping.	
Examples	*Student teams research information on where animals live, how animals act, and how they look to create an "Animal Jeopardy" Game (3.5.1).* *After investigating animal body coverings through photographs, videos, and children's literature, students construct a chart showing which animals have fur, which have feathers, which have scales, which have shells, and which have bare skin (3.5.2).*
3.6. Broad Concept: Plants and animals have predictable life cycles. As a basis for understanding this concept,	
Students:	
1. Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death.	
2. Describe the life cycle of some living things, such as the frog and butterfly, including how they go through striking changes of body shape and function as they go through metamorphosis.	
3. Compare and contrast how life cycles vary for different living things.	
Examples	*Students plant five different kinds of seeds including radish, rye grass, zinnias, Wisconsin Fast plants, and lima beans. They compare and contrast their life cycles over time from shortest to longest (3.6.1).*

LIFE SCIENCE (CONTINUED)	
	Students observe, monitor, and record through drawings the changes in the life cycle of an insect such as a butterfly (3.6.2).
	Students create life cycle wheels for a human, cat, guppy, mealworm, frog, and bacterium cell to show differences (3.6.3).

3.7. Broad Concept: Humans have a variety of mechanisms to stay healthy. As a basis for understanding this concept,

Students:

1.	Explain that people need water, food, air, waste removal, and a particular range of temperatures, just as other animals do, although different animals can tolerate very different ranges of temperature and other features of their surroundings.
2.	Explain that eating a variety of healthful foods and getting enough exercise and rest help people stay healthy.
3.	Explain that some things people take into their bodies from the environment can hurt them, and give examples of such things.
4.	Recognize that food provides energy as well as materials for growth, maintenance, and repair of body parts.
5.	Recognize that vitamins and minerals are substances required by the body in small amounts to synthesize essential substances and carry out essential processes.
6.	Describe how, as a person matures, the amounts and kinds of food and exercise needed by the body change.

Examples	*Students compare and contrast reptiles to humans as they relate to their ability to withstand external temperatures of day and night. They describe what humans might need to do to survive in very hot or very cold temperatures (3.7.1).*
	Students make a poster to communicate effective nutrition and health habits, using foods from their customary diets based on www.nutritiondata.com (3.7.2).
	Students interview family members about their sleep, exercise, and eating routines (3.7.2).
	Students cover a piece of white cardboard with Vaseline and place the cardboard outside in an open but protected place. A week later, they look at the materials that have collected on the board during the week for evidence of dirt and pollution (3.7.3).
	Students trace the path of food, from the mouth to excretion, on some model or drawing of the human body. Along the way, they identify the parts of the body that can use energy for maintenance and repair. They identify which of their body parts are growing (3.7.4).
	Students read labels of vitamin bottles and make a chart comparing what each vitamin is supposed to do. They compare that information with research found on www.nutritiondata.com (3.7.5).
	Students compare the breakfast, lunch, and dinner meals that they eat with the breakfast, lunch, and dinner meals of a newborn baby. They distinguish the kinds of activities that predominate eachstage of life and discuss the amounts of energy needed to do them (3.7.6).